Precalculus TEST 9 (Ch 6.3-6.7) NAME_____

LMCA Version A Date _____

You must show all work to receive credit! 10 *points each unless noted.* **Simplify when possible!!**

1. Write $(2, 60°)$ in rectangular form. 1._____

2. Write $(4, -4\sqrt{3})$ in polar form. 2._____

3. Using your calculator, graph $r = 4\sin\theta$ 3._____

4. Using your calculator, graph $r = 2 + 3\cos\theta$ 4._____

5. Write in Trig polar form: $z_1 = 1 - \sqrt{3}i$ 5._____

6. Write in standard form, $a + b$. $z_2 = 3(\cos 135° + i\sin 135°)$ 6._____

7. Multiply and divide the following: 7._____

   $z_2 = 5(\cos 60° + i\sin 60°)$ and $z_3 = 2(\cos 210° + i\sin 210°)$ 7._____

Use the following vectors in problems 1–6.

$\mathbf{u} = \langle 12, 5 \rangle = 12\mathbf{i} + 5\mathbf{j},\ \mathbf{v} = \langle -4, 3 \rangle = -4\mathbf{i} + 3\mathbf{j},\ \mathbf{w} = \langle 2, 3 \rangle = 2\mathbf{i} + 3\mathbf{j}$

1. $\|\mathbf{u}\| =$ 1._____

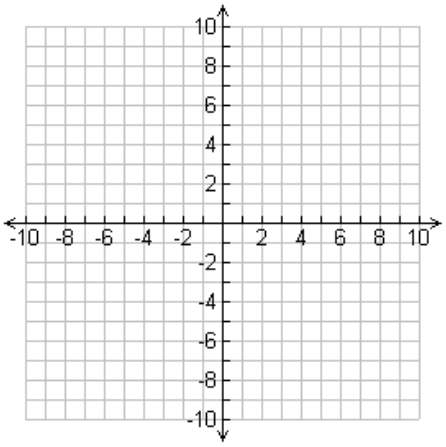
2. $2\mathbf{u} - 3\mathbf{v} + \mathbf{w}$ 2._____

3. $\|\mathbf{u} + \mathbf{v}\|$ 3._____

4. Find the angle theta θ between vectors $\mathbf{u}$ and $\mathbf{v}$. 4._____

5. $\mathbf{u} \bullet \mathbf{v} =$ 5._____

6. Draw the graph of $\mathbf{v} + \mathbf{w}$. Label everything!



7. Find the unit vector for $\mathbf{u} = \langle 6, -8 \rangle = 6\mathbf{i} - 8\mathbf{j}$ 7._____

Use $\vec{\mathbf{v}} = \langle 3,4 \rangle = 3\vec{\mathbf{i}} + 4\vec{\mathbf{j}}$ *and* $\vec{\mathbf{w}} = <2,0> = 2\vec{\mathbf{i}} + 0\vec{\mathbf{j}}$ for #8-10.

8. Write the formula for the projection of **v** onto **w**. $\text{proj}_{\vec{\mathbf{w}}}\vec{\mathbf{V}}$

9. Find $\mathbf{v_1} = \text{proj}_{\mathbf{w}}\mathbf{V}$. 9._____

10. Find $\mathbf{v}_2$. Hint: $\mathbf{v} = \mathbf{v_1} + \mathbf{v_2}$ 10._____

Extra Credit. Let $\vec{\mathbf{u}} = \langle 4,2 \rangle$, $\vec{\mathbf{v}} = \langle -3,5 \rangle$.
Find the angle between the vectors $\vec{\mathbf{u}}$ and $\vec{\mathbf{u}} - \vec{\mathbf{v}}$. Draw Picture.